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F. Gofa, D. Boucouvala, P. Louka, H.A. Flocas

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Spatial verification approaches as a tool to evaluate the performance of high resolution precipitation forecasts

Gofa F. [1*], Boucouvala D.[1]., Louka P.[2], Flocas H. A.[3]

1 Hellenic National Meteorological Service, Hellinikon GR-16777, Athens, Greece
2 Department of Mathematics and Physics, Hellenic Air Force Academy, Athens, Greece
3 Division of Environmental Physics and Meteorology, Department of Physics, National & Kapodistrian University of Athens, Greece

Corresponding author: Flora Gofa, Hellenic National Meteorological Service, Hellinikon GR-16777, Athens, Greece, fgofa@hnms.gr

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Abstract

The spatial resolution of Numerical Weather Prediction (NWP) models has increased significantly in recent years. While high-resolution models are able to produce more detailed precipitation structures, their true benefit lies in more realistic statistics rather than the information provided for a specific grid point. Unfortunately, NWP model verification using traditional grid-point-by-grid-point methods has not managed to keep pace due to the limited amount of point observations available in comparable resolution. Spatial verification methods represent a possible solution since they reward closeness or resemblance by relaxing the requirement for exact matches between the forecast and observations.

An intense convective event in the Mediterranean region is used as a test case to analyze the forecasting performance of the Consortium for Small-scale Modeling model (COSMO) at two different resolutions. Satellite estimates of precipitation are used as ground truth. The precipitation forecasts are assessed using various spatial methods and averaging techniques, each of which provides distinctly useful information on model performance.

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